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**Amendments**

Please amend the above-identified application as follows:

**In the Claims:**

Please amend claim 1 by substitution as follows:

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1. An  $m \times n$  sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers

being connected to respective ones of said sensors;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels; and

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

✓ Please delete claim 2.

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Please amend claims 4, 13, 17-18, and 21-23 by substitution as follows:

4. A sensor array, comprising:  
distribution fiber lines;  
return fiber lines; and  
sensor groups, each of said sensor groups comprising:  
sensors; and  
input couplers and output couplers, said input couplers and said output couplers  
being connected to respective ones of said sensors; and  
wherein coupling ratios of said input couplers and said output couplers are chosen to  
reduce differences in the returned optical signal power levels, said input couplers in a first sensor  
group having a first input coupling ratio and said input couplers in a second sensor group having  
a second input coupling ratio different from said first input coupling ratio;  
wherein one or more signal sources, that comprise a first signal source, are coupled with  
respective ones of said distribution fiber lines, that comprise a first distribution fiber line;  
wherein said input couplers comprise a first input coupler and a second input coupler,  
wherein a first number of said input couplers are located on the first distribution fiber line  
between the first signal source and said first input coupler, wherein the first number is greater  
than or equal to zero, wherein the coupling ratio of said first input coupler is based on the first  
number, wherein a second number of said input couplers are located between the first signal  
source and said second input coupler, wherein the coupling ratio of said second input coupler is  
based on the second number, wherein the second number is greater than the first number,  
wherein the coupling ratio of said second input coupler is larger than the coupling ratio of said  
first input coupler;

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*et  
end*

wherein each output coupler is connected to a respective return fiber line from a sensor group having a coupling ratio that differs from the coupling ratio of the other output couplers connected to the respective return fiber line, wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler, said input coupling ratios and said output coupling ratios selected in accordance with respective locations of said input couplers on said distribution fiber lines and respective locations of said output couplers on said return fiber lines.

*Sub E7  
C3*

13. The array of claim 1, wherein the coupling ratios of said input couplers and said output couplers in said z sensor groups serve to cause all the returned optical signal power levels to be within a preselected variance range.

*Sub  
E9*

17. The array of claim 1, wherein z is 16 and y is 6.

18. The array of claim 1, wherein z is 8 and y is 12.

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21. An  $m \times n$  sensor array, comprising:

m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers

being connected to respective ones of said sensors; and

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels, wherein said input couplers comprise a first input coupler and a second input coupler, wherein a first number of said input couplers are located between a signal source and said first input coupler on one of said m distribution lines, wherein the first number is greater than or equal to zero, wherein a second number of said input couplers are located between the signal source and said second input coupler on the distribution line, wherein the second number is greater than the first number, wherein the input coupling ratio of said second input coupler is higher than the input coupling ratio of said first input coupler;

wherein m is 6 and n is 16.

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22. An  $m \times n$  sensor array, comprising:

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*cont*  
m distribution fiber lines;

n return fiber lines; and

z sensor groups, each of said z sensor groups comprising:

y sensors; and

input couplers and output couplers, said input couplers and said output couplers being connected to respective ones of said sensors, each of said input couplers within any one of said z sensor groups being connected to a different one of said m distribution fiber lines;

wherein the n return fiber lines comprise one or more sets of return fiber lines, wherein a first one of each of the one or more sets of return fiber lines is connected to a first subset of said output couplers within a respective one of said z sensor groups, wherein a second one of each of the one or more sets of return fiber lines is connected to a second subset of said output couplers within the respective one of said z sensor groups;

wherein coupling ratios of said input couplers and said output couplers in said z sensor groups are chosen to reduce differences in the returned optical signal power levels; and

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CS D3  
encl

wherein said output couplers comprise a first output coupler and a second output coupler, wherein a first number of said output couplers are located between said first output coupler and a signal destination on one of said n return fiber lines, wherein the first number is greater than or equal to zero, wherein the coupling ratio of said first output coupler is based on the first number, wherein a second number of said output couplers are located between said second output coupler and the signal destination on the one of said n return fiber lines, wherein the coupling ratio of said second output coupler is based on the second number, wherein the second number is greater than the first number, wherein the coupling ratio of said second output coupler is larger than the coupling ratio of said first output coupler;

wherein m is 6 and n is 16.

Sub  
212

23. The array of claim 22, wherein the one or more sets of return fiber lines comprise one or more pairs of return fiber lines, wherein a first return fiber line of each of the one or more pairs of return fiber lines is connected to the first subset of said output couplers within the respective one of said z sensor groups, wherein a second return fiber line of each of the one or more pairs of return fiber lines is connected to the second subset of said output couplers within the respective one of said z sensor groups.

Please add claims 25-30 as follows:

25. The array of claim 1, wherein each of said input couplers within any one of said z sensor groups is connected to a respective one of said m distribution fiber lines.

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26. The array of claim 1, wherein each of said return fiber lines is connected to all output couplers within a respective one of said z sensor groups.

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*encl*  
*Sub*  
*814*
27. The array of claim 21, wherein z is 16 and y is 6.
28. The array of claim 21, wherein z is 8 and y is 12.
29. The array of claim 22, wherein z is 16 and y is 6.
30. The array of claim 22, wherein z is 8 and y is 12.
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